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AUTHOR Swank, Anne Laney Greenwood
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ABSTRACT

The purpose of this study was to provide teachers and principals with concrete evidence to demonstrate that weekly math homework increases academic performance in math. This study focused mainly on homework's effects on quiz scores. It compared quiz scores of students who did homework with those who did not. The subjects of this study included 21 9- and 10-year-old fourth graders. The researcher used an independent sample t-test to evaluate the weekly quiz scores of students who completed weekly math homework assignments and those who did not. Results showed no significant difference in academic success between students who complete weekly math homework and students who do not complete weekly math homework. (Contains 14 references.) (CCM)

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ED 433 234

THE EFFECT OF WEEKLY MATH HOMEWORK ON FOURTH GRADE STUDENT MATH PERFORMANCE

An Action Research Project

Presented to the

Department of Teacher Education

Johnson Bible College

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In Partial Fulfillment

Of the Requirement for the Degree

Master of Arts in Holistic Education

by

Anne Laney Greenwood Swank

July 1999

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ABSTRACT

The purpose of this study was to provide teachers and principals with concrete evidence to demonstrate that weekly math homework increases academic performance in math. This study examined whether or not homework was beneficial in the subject of math, focusing mainly on homework's effects on quiz scores. It compared quiz scores of students who did homework with those who did not. The hypothesis in the study stated that there was no significant difference in academic success between children who completed weekly math homework assignments with those who did not complete weekly math homework assignments at the .05 level of significance. This academic success included scores on weekly math quizzes. The entire study lasted for nine weeks.

The subjects of this study included twenty-one nine and ten year old fourth graders. The elementary school in Eastern Tennessee, where all of the research took place, was a semi-rural school that is changing toward a suburban school due to continued growth in the community. Weekly quizzes were given each Friday to test students' knowledge of specific skills covered during that week. All of the scores for the weekly quizzes were recorded and analyzed to observe the degree of impact homework had on them.

The control group in this research project consisted of the children who did not complete the weekly math homework assignments. The experimental group consisted of the students who completed weekly math homework. The experimental factor in this research project was the optional weekly math homework. The researcher used an independent sample t-test to evaluate the weekly quiz scores of students who completed weekly math homework assignments and those who did not. This test was completed at the end of each weekly quiz.

Based on these results from nine weeks of testing and study, the researcher accepts the hypothesis that there is, in general, no significant difference in academic success between

students who complete weekly math homework and students who do not complete weekly math homework. The results from this research were beneficial to the ongoing debate of whether or not homework should be given in the elementary school. Lengthy homework assignments that focused on drill and practice seemed to not be effective. Homework was at best in this study a limited tool in aiding student academic success on the weekly math quizzes. While homework was somewhat effective when it was meaningful and relative to the material being covered, it did not show a great deal of significance in this study.

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Chapter I

INTRODUCTION

Significance of the Problem

Homework has always been a hotly debated topic in elementary schools throughout the nation. Many teachers and parents ask, "Should homework be given to young children?" and "If so, how much?" These questions and many others concerning elementary homework must be answered. However, the burden of this decision often lies on elementary school principals and teachers. Teachers usually implement their own standard of homework with the support of the principal since there is no national standard of homework or any consensus on when and how much homework should be given.

The purpose of this study was to provide teachers and principals with concrete evidence to demonstrate that weekly math homework increases academic performance in math. This study examined whether or not homework was beneficial in the subject of math, focusing mainly on homework's effects on quiz scores. It compared quiz scores of students who did homework with those who did not. A summary of the reasons for choosing to require weekly math homework assignments is included in the Conclusions section of this research project.

Statement of the Problem

The present study investigated whether or not students who completed weekly math homework assignments scored higher on weekly math quizzes than did students who did not complete this homework.

Justification of the Study

This research project was important because it demonstrated whether or not homework was a useful and important tool to aid student retention and success in the subject of math. This success focused mainly on weekly success on quizzes. However, it could potentially have an impact on more long-term success on unit tests and six weeks scores. It may also have implications for scoring on the Terra Nova tests that are given by the State of Tennessee each spring in the elementary schools.

Definition of Terms

Homework For the purpose of this study, homework was defined as math assignments that were sent home on Monday and due on Friday of each week. All of these assignments were optional. Individual students and/or parents made the decision each week to complete math homework assignments. For example, some students chose to complete the math homework for one week and chose not to complete the homework assignment for the next week. This decision was not dictated in any way by the researcher or the teacher. Students and/or parents made the decision to complete the weekly math assignments.

Weekly quizzes Weekly quizzes in math were those made by the teacher or researcher each week. They were based on student needs in the particular unit being studied in the math curriculum. Every student in the classroom took a math quiz on Friday of each week.

Unit tests Unit tests were those designed by the County and given after each unit of study in math. They were given to students beginning in the first grade and continue through the fifth grade. Students in this study who were below grade level took the unit test that corresponded to their abilities.

Limitations to the Study

There were several limitations to this study. First, the sample size was extremely small. There were only twenty-two children in the class, two of whom are considered to be

mentally retarded. Secondly, more than one unit in the math curriculum was covered during the course of this research project. The differences in difficulty and student needs may have had some impact on the study. For example, units on numeration tend to be much easier for fourth grade students than do the units covering multiplication and division. The research was done in one school and one classroom and was completed in a relatively short amount of time (only nine weeks). Finally, the students were allowed to choose whether to do homework each week. This was a limitation because data changed weekly with the students who chose to do the homework assigned for that week. The researcher considered the possibilities of all or none of the students completing the homework assignments in a given week. If all students opted to do all the homework (or none of the homework in a given week of the research), this data was excluded from the statistical part of the study. It would then be addressed in the Conclusions section of this research project. All of these limitations may have had an impact on the study.

Assumptions in the Study

The following assumptions were made in this study: every child had an equal opportunity to learn in this classroom; there was a fair sampling of students to represent the total fourth grade population of an elementary school in Eastern Tennessee; and some of the children in the classroom may have had a natural intelligence for mathematics (Gardner, 1993, p. 15). Howard Gardner describes this as the Logical-Mathematical Intelligence, which enables students to reason logically in mathematics and science and solve mathematical problems quickly (Gardner, 1993, p. 15). For these students homework may have made no difference in the academic achievement on quizzes. However, they were still included in the study because it represented a typical classroom situation. This situation will be addressed in the Conclusions section of this action research project.

Hypothesis of the Study

There is no significant difference in academic success between children who complete weekly math homework assignments and those who do not complete weekly math homework assignments at the .05 level of significance. This academic success includes scores on weekly math quizzes.

Chapter II

REVIEW OF RELATED LITERATURE

Homework has always been a topic of debate in school systems across the United States. From elementary school to college, teachers, principals, and professors have considered the positive and negative effects of homework on their pupils. However the research on homework is sparse. Educators deal with homework every day but still have no proof as to whether or not homework actually improves academic performance. Most studies focus on the attitudes that students have toward homework and the relationships among homework and student achievement. This study takes the research one step farther and focuses on a specific subject and whether or not homework plays a role in student achievement.

Homework has been distinguished by major shifts in policy and practice over the course of this century. However, as the twentieth century comes to a close, a strong consensus supports homework as a vital and integral requirement of American schooling (Walberg, et. al., 1985, p. 77). Many educators now agree that the more homework given the better. This was not always the case. Homework's history is filled with bitter battles to eliminate it from schools. Many "progressive" educators of the early twentieth century regarded homework as inconsistent with the best pedagogical thinking (Gill and Schlossman, 1996, p. 27).

Homework in the earlier part of this century was very repetitious focusing totally on the "trinity"—drill, memorization, and recitation (Gill and Schlossman, 1996, p. 31). Teachers expected students to spend two to three hours each night memorizing math facts, presentations for history, and lengthy passages of literature, which had to be recited in class.

Parents were the first to disagree with the amounts of homework. Often they needed their children to help with chores and other survival tasks. This is the main reason that most children dropped out of school at such a young age. School, because of the incredible amount of homework, was a full-time job.

As progressive education rose in popularity, the anti-homework sentiment grew as well. General Francis A. Walker, a Civil War hero who served as the president of the Boston, Massachusetts school board in the early 1900's, gave two concerns that eventually became the central argument of anti-homework crusaders. "First, he doubted the utility of homework as a pedagogical tool. Second, he worried that homework sapped children's health, mentally and emotionally as well as physically" (Gill and Schlossman, 1996, p. 32). Opposition to homework eventually became something to be proud of to educators who labeled themselves as progressive.

The public also became vocal in the fight against homework. Magazines and newspapers wrote article after article opposing homework. One editor claimed that homework was a severe hazard to children's mental and physical health and that it was "the most barbarous part of the whole system" (Gill and Schlossman, 1996, p. 33). Articles such as this enraged progressive educators and parents in large cities throughout the United States and soon began to spread across the country. Homework was restricted in the elementary grades in school systems nationwide. Progressive educators continued to argue that homework was detrimental to the health of children and even began to argue that it worked against the family unit.

Finally, the question of whether or not homework increased academic performance came into the debate. Progressive educators believed that students should experience active learning. Homework, with its repetition and recitation, was very passive, as were many classrooms during this time. These classrooms and the homework assigned in them did not include any type of hands-on or meaningful learning. Instead, students sat at their desks and

memorized facts. If homework of this era were placed in the cognitive domain of Bloom's Taxonomy, it would fall in the Knowledge level. Bloom describes this level as rote memorizing of information in a basically word-for-word fashion (Bloom, et. al., 1956, p. 45). Progressive educators not only wanted homework reform but total education reform as well. They felt that children could only succeed in an environment where learning could be at its peak. These places did not include the home, where there was poor lighting, noise, and many distractions. Thus, another anti-homework argument arose.

By the middle of the twentieth century, progressive education had lost some of its appeal and popularity. Educators began to seriously reconsider their stance on homework. With the beginning of the race to space, the public cried out for educational reform. Students were not as smart as their foreign counterparts, and this worried parents and school officials. Thus, homework was reintroduced to schools almost as quickly as it was removed. The past forty years have passed with a general agreement that homework was a positive tool that enabled learning. Although debate still occurs, it usually comes in the form of what kind of homework is best or how much is too much.

Attitudes about homework vary. In the American culture, students usually view homework and school as negative aspects of their lives. However, in other countries, especially those of Eastern Asia, most students view schoolwork and homework as important tools for success. Hong researched this phenomena with American and Korean children. The study involved 182 Korean fifth and sixth graders and 93 American fifth and sixth graders. Homework achievement and attitudes toward homework were examined. The researchers also studied how parental involvement impacted the attitudes and achievement of the selected students. They used the following instruments to test the children on these factors: the Learning Style Inventory, used to measure each child's learning style; the Homework Style Scale, which indicated how each child preferred to learn at home; and the Homework Behavior Scale, which consisted of items that measured homework achievement

and homework attitudes (Hong, et. al., 1995, p. 199). Each of these instruments were adapted to meet the needs of the Korean students.

Significant differences were found between the two countries and among the three levels of homework achievement (high, medium, and low) on the overall combined score for homework styles (Hong, et. al., 1995, p. 200). The researchers used twenty-one univariate analyses of variance to study the country differences on the individual homework-styles scores. Fourteen of the twenty-one homework styles showed significant differences between the Korean and the American children (Hong, et. al., 1995, p. 200). Korean children preferred a more structured learning environment, while the American children preferred a learning environment that was very comfortable. While the Korean children were much more persistent than the Americans were, the children from the United States were more parent-motivated and teacher-motivated in doing homework. When attitudes towards homework were investigated between the two countries, significant differences were found. The Korean children had much more positive attitudes towards homework than American children (Hong, et. al., 1995, p. 202).

The researchers found other significant factors. While all parents of the 182 Korean children who participated in the study returned the questionnaire, only 33 parents of the 93 American children returned the questionnaire (Hong, et. al., 1995, p. 204). This showed more parental involvement of the Korean students, which could have impacted the attitudes and achievement of these Korean participants.

Other articles dealing with homework focus on more practical ideas to offer to teachers, parents, and students. For example, in an article by Culyer entitled, "Making Homework Work," he gives twelve guidelines to teachers and other educators that help make homework more effective. Some of these include informing parents, making the homework assignments relevant, assigning homework at each student's individual level, and explaining to students why homework is assigned (Culyer, 1996, p. 52-53). While Culyer did

not state any research to back up these guidelines, all of these ideas encourage teachers to create more meaningful homework for their students. Meaningful homework is the key to making homework successful. Researchers agree that there is little doubt that properly assigned and processed homework can be advantageous for learning (Kelley and Kahle, 1995, p. 8). However, the key is that homework needs to be meaningful and not just busywork. Teachers often assign homework to their students to practice and strengthen the concepts and skills taught in class (Miller, et. al., 1993, p. 184). This is an important tool to check for student understanding, but it is not the only one.

Homework takes four steps to become meaningful (McLean, 1997, p. 212). First, teachers must motivate students to do the homework. Second, teachers should carefully plan homework assignments that are not repetitive and monotonous. These assignments should contribute to the learning of the overall unit of study. Third, teachers must make the grading standards clear and precise and discuss them in advance with the students. Finally, teachers must focus on consistency. Standards should be maintained throughout the course of study.

Researcher Harris Cooper has reported extensively on homework in American education and probably knows more about it than anyone. For years, he has studied its history and effectiveness in large-scale studies. He has found many positive effects from homework. These include improving students' study skills, helping students learn more factual information, developing their self-direction and responsibility, and involving parents in their children's education (Cooper, et. al., 1998, p. 70). However, Cooper finds the negative effects of homework just as substantial. It can overwhelm students and cause them to turn off from school and studying in general. It can prevent their using after-school time for more active pursuits and cause them to take shortcuts (such as copying or cheating) to get an assignment completed on time. It can promote interference by parents in their children's learning.

When Cooper examined research on homework and student achievement, he found different effects at different grade levels. In high school, homework substantially raises student achievement. In middle school, it raises student achievement about half as much. In the elementary grades, it has no discernible effect (Cooper, 1989, p. 7). In fact, Cooper states, "Piling on massive amounts of homework will not lead to gains, and may be detrimental by leading children to question their abilities" (Cooper, 1989, p. 8). He also goes on to say that homework is not entirely negative. "Homework has benefits that go well beyond its immediate direct impact on what's going on in school. Doing homework is important for honing organizational skills, learning how to manage time, and developing the ability to learn autonomously" (Cooper, 1989, p. 21).

In Cooper's most recent study to date, he investigated the relationships among attitudes about homework, the amount of homework assigned and completed, and student achievement. Students, teachers, and parents completed a questionnaire concerning the amount of homework assigned by teachers, the portion of assignments completed by students, and attitudes about homework (Cooper, et. al., 1998, p. 70). Cooper used what he referred to as a triad in this study to achieve the desired sample size. This triad included a teacher, at least one student in that teacher's class, and one parent of that student (Cooper, et. al., 1998, p. 72). A total of 709 complete triads were used in this study. The response rate among the questionnaires was very low. This was due to several factors. First, the questionnaire was much longer than ones given in previous studies, requiring parents to spend a longer amount of time completing it. Second, the study required only complete triads. This lowered the response rate when either a parent or a student could or did not participate. Finally, the response rate was lowered because there was no pre-screening to eliminate those students without current home addresses.

Three school districts were involved in Cooper's study (Cooper, et. al., 1998, p. 72). One was a large metropolitan public school district in the state of Tennessee. The second

was a suburban school district, and the third was a rural school district, both in the state of Tennessee. Cooper used the Homework Process Inventory (HPI) as his questionnaire for the study. This was developed specifically for this study and was meant to assess numerous aspects of homework practices and procedures. The questionnaire was a multi-item survey that had six different versions, one each for lower and upper grade students, their teachers, and their parents. The different versions included parallel questions so that consistency of responses across the six versions could be examined (Cooper, et. al., 1998, p. 73). The survey included questions about attitudes toward homework, how much time was spent on homework, how much homework was assigned, and how much of the assigned homework was typically finished. Cooper used the standard achievement test in Tennessee, the Tennessee Comprehensive Assessment Program (or TCAP), to measure achievement in the study. This was done to save time and money, as this test is part of the normal testing schedule of all Tennessee school districts. Teacher-assigned grades were also used as a measure of achievement for the study. In the lower grades, the teachers provided an overall grade for all subjects, while in the upper grades, teachers provided grades for each individual subject.

Cooper and his colleagues found that the amount of homework assigned was average across the grade levels. Cooper states, "The means revealed that most responses concerning the amount of homework teachers assigned centered around the middle of the scale, or '15 to 30 min' each night, except for parents of upper-grade students, whose responses were closer to '30 to 60 min'" (Cooper, et. al., 1998, p. 75). In general, teachers thought that they had assigned more homework, while their students thought this amount was average. Students also reported being assigned less homework than their parents thought they were assigned. Reports of how much homework students completed revealed a more skewed distribution. Among parents, about 75% reported that their child completed all homework. Among students, 65% reported completing all homework (Cooper, et. al., 1998, p. 76).

Attitudes towards homework were proven to be quite positive in the lower grades. Teacher and parent responses were well above the set midpoint. However, upper grade responses were more negative. Student responses were somewhat below the midpoint. Teacher attitudes toward homework seemed to be much more positive for the upper and lower grades than did parent attitudes. Reports of teacher-assigned homework were negatively, but not significantly, correlated with TCAP scores (Cooper, et. al., 1998, p. 76). The amount of homework assigned by teachers was not significantly related to achievement in either the lower or upper grades. However, when Cooper explored the relationships between homework attitudes and achievement, he found that, in the lower grades, teachers who had more positive homework attitudes also had students who averaged poorer scores on the TCAP. For the upper grades, he found negative but nonsignificant relations between teacher attitudes, both their average students' TCAP score, and the average grade they assigned (Cooper, et. al., 1998, p. 78).

Cooper suggests in his research that teachers, students, and parents may hold different expectations about homework (Cooper, et. al., 1998, p. 80). Because each person is involved in a different aspect of the homework process, each person views homework differently. For example, teachers are only involved in the school-related affairs, while parents and students are involved at home as well. In sum, this study's results indicated generally weak yet positive relations between reports of the amount of homework teachers assigned and student achievement (Cooper, et. al., 1998, p. 80). However, there was no significant correlation to show that the more homework assigned the better the student achievement. Likewise, the research did not show that assigning less homework provided any difference on students' levels of achievement.

The current research went one step farther than the research mentioned. It focused on the relationship of homework to a specific subject and grade level—fourth grade math. The researcher believed that the completion of weekly homework would have an impact on

weekly quizzes. Although this study is not nearly as advanced as those mentioned above, the researcher believed that it would still hold implications for teachers and other educators.

Chapter III

METHODS AND PROCEDURES

Subjects of the Study

The subjects of this study included twenty-one nine and ten year old fourth graders. There were thirteen males and nine females in the study, with twenty Caucasians and one African-American. Three children were considered to be learning disabled and had IEP's, or Individual Education Plans. These three children were included in this study because they were considered to be at or just below grade level in the subject of math. However, their homework assignments were modified to meet their particular needs at their math level. Weekly quizzes and unit tests also correlated with their abilities in math. Two students in the classroom were classified as LRE, or Least Restricted Environment. They were both mentally handicapped and did not participate in the study because it was not applicable to their individual needs. Sixteen of the students lived with their biological parents; two lived with a parent and a stepparent; and one lived with a single parent. At least one parent in each household was employed. All but three of the subjects had siblings.

On second grade TCAP (Tennessee Comprehensive Assessment Program) testing, these students averaged a state percentile of 65 in total mathematics computation. This average encompassed all of the children except two who transferred into the school system where the research took place. On the third grade Terra Nova assessment, these subjects averaged a state percentile of 57 in total mathematics computation. (This average included all students except one who transferred this year.) All of the children were given the fourth grade math placement test on August 31, 1998 to determine their math level for this year. Seventeen of the students in the class were on the fourth grade math level, and three of the

students were on a third grade math level. (This figure does not include the two LRE students who were not included in the study.)

Population for the Study

The elementary school in Eastern Tennessee, where all of the research took place, was a semi-rural school that is changing toward a suburban school due to continued growth in the community. Most of the 400 students came from average income families. Only twenty percent of the students at this school received free or reduced lunch. Five classrooms at the school were considered to be 21st Century classrooms. (This is a designation given to schools in Tennessee that are equipped with state-of-the-art computer and multi-media equipment.) The classroom where the research was conducted was a 21st Century classroom.

This school was also considered to be an Alpha Cluster school. This is a title given by the County. Approximately ten years ago, the County designed the School Context Assessment to group elementary and middle schools by demographic and community factors. Their idea was to document the need to consider the environmental contexts of schools when comparing such things as student achievement, student behavior, parental involvement, and the organization and management of schools. Schools across the County range from affluent suburban schools to inner-city schools. Thus, the Office of Research and Evaluation of this school system defined six variables as negative "extenuators." These six factors were identified and considered to be negative because as their presence increases the difficulty in achievement increases and the number of "at-risk" students increases. The six factors include the following: school size, free/reduced lunch, students with disabilities, mobility (student turnover), aberrant behavior, and housing subsidies. Schools with similar profiles are grouped together and are placed on an extenuator index and assigned to one of four elementary clusters or three middle school clusters. The County believes that the extenuators accurately profile schools, but that the presence of most of the extenuators is

beyond the control of the principal and faculty. For the extenuator index, schools were ranked from high to low and then grouped by specific increments. The schools were then ranked by the averages and assigned to one of the four clusters named: Delta, Gamma, Beta, and Alpha. (These are listed from the most number of negative extenuators to the least number of negative extenuators.) Schools high on the index make up the Delta Cluster and tend to have more negative extenuators or risk factors. Schools low on the index make up the Alpha Cluster and tend to have fewer negative extenuators or risk factors. Thus, the school used for this research received a ranking in the Alpha Cluster and was considered to be a relatively risk-free school.

Timeline for the Study

Research began on Monday, September 21 and ended on Friday, December 11. This time schedule encompassed the second and third six weeks grading periods. The entire study lasted for nine weeks. No research took place during several weeks in November. This was done because of the hectic and unusual scheduling around the holidays and because of the researcher's absence from the classroom at this time. The researcher believed that this two-week span would be difficult for the students and that it would be best for the accuracy of the study if homework was not assigned during this time. Thus, these weeks were excluded from the study.

Testing

Weekly quizzes were given each Friday to test students' knowledge of specific skills covered during that week. Either the classroom teacher or the researcher designed these quizzes. They correlated with the math unit covered. The quizzes were also adapted to meet the needs of students who were below grade level in math. All of the scores for the weekly quizzes were recorded and analyzed to observe the degree of impact homework had on them.

Experimental Factors

Homework was the experimental factor introduced to the subjects. Most of the subjects were introduced to homework in the second and third grades but had no choice as to whether or not they had to complete it. In this particular classroom, the teacher decided to make weekly math homework optional. This was an idea she acquired from schools in Australia, where she visited last year. Students and/or parents decided whether homework needed to be done each week. Thus, quiz scores of children who completed weekly math homework were compared with these same scores of students who did not. Even though students and parents changed their minds from week to week, data was still collected, compared, and analyzed.

The control group in this research project consisted of the children who did not complete the weekly math homework assignments. The experimental group consisted of the students who completed weekly math homework. Both groups were given the same pages to complete for homework. However, the control group opted not to complete the work, while the experimental group opted to complete the assignments. The experimental factor in this research project was the optional weekly math homework.

Statistical Analysis of Collected Data

The researcher used an independent sample t-test to evaluate the weekly quiz scores of students who completed weekly math homework assignments and those who did not. A t-test is a test of the "statistical significance of the results of a comparison between two groups" (Vogt, 1993, p. 235). Thus, the researcher compared the scores of students who completed the math homework with the scores of students who did not complete the math homework. This test was completed at the end of each weekly quiz.

Chapter IV

RESULTS

The researcher analyzed all of the statistics in this chapter using the software program, SPSS®. Data from the nine weeks of the study was recorded into SPSS and then an independent samples t-test was run. This particular test was used to compare the weekly quiz scores of the control and experimental groups. The control group consisted of the children who did not complete the homework assignment, while the experimental group was composed of those students who completed the assignment.

The first week of the study showed very biased results of the effects of homework on the students' math performance. Because the children in the study have been so conditioned to complete assigned homework in younger grades, the first week only one subject did not complete the homework. The results from Table One had no variance when the researcher used Levene's Test for Equality of Variances found in the SPSS program. This was most likely due to the fact that the number of students who completed homework for this week and the number of children who did not complete homework for this first week were so extreme. However, a comparison of means for scores on Table One showed that the one student who did not complete the homework scored higher than those who completed the assignments. These means were most likely skewed because only one subject chose not to complete the homework for week one. These results were not significant at the 0.05 level of significance.

TABLE 1

Comparison of Quiz Scores for

Control and Experimental Groups-Week One

Groups	N	Mean	Mean Difference	Std. Error of Means	t ratio	Sig. 2-Tailed
Control	1	95.00				
			13.72	13.60	1.00	.327*
Experimental	18	81.28				

*Not Significant

Results from Table Two showed that more subjects were not completing homework than in the first week of the study. However, the mean of quiz scores for students who completed homework was lower than the mean of quiz scores for those students who did complete the weekly homework assignments. Equal variances were assumed for this week, but the results were not significant at the 0.05 level of significance.

TABLE 2

Comparison of Quiz Scores for

Control and Experimental Groups-Week Two

Groups	N	Mean	Mean Difference	Std. Error of Means	t ratio	Sig. 2-Tailed
Control	5	85.00				
			.99	7.12	.32	.752*
Experimental	14	82.71				

*Not Significant

Table Three showed the first week of the study for more of the subjects to not complete the homework. As has been the case for the first two weeks the mean of quiz scores for those who did not complete homework was higher than the mean for students who did complete the weekly math homework. Upon interpreting Levene's Test for Equality of Variances, run through SPSS, equal variances were assumed. The results from this week were not significant at the 0.05 level of significance.

TABLE 3

Comparison of Quiz Scores for

Control and Experimental Groups-Week Three

Groups	N	Mean	Mean Difference	Std. Error of Means	t ratio	Sig. 2-Tailed
Control	11	85.36				
			.99	4.84	.20	.841*
Experimental	8	84.38				

*Not Significant

Results from Table Four show not only that most of the subjects were not completing the homework but that the mean for quiz scores had dropped from the previous weeks of the study. This was due to the change in math units. Tables One, Two, and Three covered addition and subtraction, while the fourth table began a unit on multiplication. Equal variances were assumed for this week, and the results were not significant at the 0.05 level of significance.

TABLE 4

Comparison of Quiz Scores for

Control and Experimental Groups-Week Four

Groups	N	Mean	Mean Difference	Std. Error of Means	t ratio	Sig. 2-Tailed
Control	11	81.27				
			6.52	5.01	1.30	.211*
Experimental	8	74.75				

*Not Significant

Table Five showed the first significant results of the study. Students who completed the homework this week scored higher on the weekly quiz than the students who did not complete the assignments. During this week the classroom teacher taught lessons on double-digit multiplication. The extra practice in homework made a difference on the mean score of those who completed the assignments. This unit of study in the math curriculum is one of the most difficult of the entire year. Thus the homework had an impact on the weekly quiz score. Equal variances were not assumed in these results. Table Five results were significant at the 0.05 level of significance.

TABLE 5

Comparison of Quiz Scores for

Control and Experimental Groups-Week Five

Groups	N	Mean	Mean Difference	Std. Error of Means	t ratio	Sig. 2-Tailed
Control	14	79.57				
			-13.43	4.12	-3.26	.005*
Experimental	5	93.00				

*Significant

Table Six results were not significant at the 0.05 level of significance, but continued to show that students who completed the math homework scored higher on weekly math quizzes than those who did not. The means for weekly quizzes were closer in this table, resulting in no significance. However, equal variances could not be assumed because Levene's Test for Equality of Variances showed a significance of 0.007.

TABLE 6

Comparison of Quiz Scores for

Control and Experimental Groups-Week Six

Groups	N	Mean	Mean Difference	Std. Error of Means	t ratio	Sig. 2-Tailed
Control	14	77.57				
			-4.23	5.70	-.74	.471*
Experimental	5	81.80				

* Not Significant

Table Seven's results returned to the pattern found during the beginning weeks of the study. More students did not complete the homework assignments but still scored higher on the weekly quiz than the students who completed the assignments. Equal variances were assumed in this test, and the results did not show significance at the 0.05 level or smaller.

TABLE 7

Comparison of Quiz Scores for

Control and Experimental Groups-Week Seven

Groups	N	Mean	Mean Difference	Std. Error of Means	t ratio	Sig. 2-Tailed
Control	12	75.92				
			3.49	5.81	.60	.556*
Experimental	7	72.43				

* Not Significant

Results for Table Eight were highly significant in the area of equal variances. When Levene's Test for Equality of Variances was run through the statistics program, SPSS, a significance of zero was determined. Thus equal variances could not be assumed. Students who completed homework this week scored higher on weekly quizzes than those who did not. However, significance was not found to be at the 0.05 level or smaller. Subjects were still opting not to complete the homework assignments.

TABLE 8

Comparison of Quiz Scores for

Control and Experimental Groups-Week Eight

Groups	N	Mean	Mean Difference	Std. Error of Means	t ratio	Sig. 2-Tailed
Control	13	81.69				
			-7.97	5.37	-1.49	.156*
Experimental	6	89.67				

* Not Significant

Results from Table Nine of this action research project showed no significance. Equal variances were assumed using Levene's Test. Students who completed the homework scored slightly higher on weekly quizzes than did the students who did not complete the homework assignments.

TABLE 9

Comparison of Quiz Scores for

Control and Experimental Groups-Week Nine

Groups	N	Mean	Mean Difference	Std. Error of Means	t ratio	Sig. 2-Tailed
Control	13	79.31				
			-1.19	7.34	-.16	.878*
Experimental	6	80.50				

* Not Significant

Based on these results from nine weeks of testing and study, the researcher accepts the hypothesis that there is, in general, no significant difference in academic success between students who complete weekly math homework and students who do not complete weekly math homework.

Chapter V

SUMMARY, CONCLUSIONS, RECOMMENDATIONS

Summary

This study involved the effects of homework on the weekly quiz scores of nineteen fourth graders. It was done over a nine-week period that encompassed two grading periods and two math units. Homework was the experimental factor in this action research project. The control group consisted of the students who did not complete weekly homework assignments. The experimental group consisted of the students who completed the weekly math homework. Results showed that homework had little effect on the overall academic success of these subjects. Small improvements were seen some of the weeks of the study. In these weeks, the students who completed the math homework scored higher on weekly quizzes than the students who did not complete the homework. However, other weeks showed just the opposite. All but one week were not significant. The researcher can conclude from the gathered data and the analysis of the statistics that homework was not, in general, a significant factor in academic achievement in math at the fourth grade level.

Conclusions

The results acquired from this study show that homework is a limited tool in the classroom. Many teachers give homework that is pointless and is simply a drill for students. This study has shown that homework is not nearly as effective in the classroom as it was once thought to be. The reason for this could be as simple as children not learning in the same ways as previous generations. The current generation of students seem to accomplish and learn more through hands-on learning and meaningful, real-life situations. Homework is no different. Math has traditionally been a subject where much homework was given. This

homework tended to be repetitious and followed the drill and practice format. The current study has shown that this is ineffective in increasing students' scores on weekly quizzes.

Some children do learn from homework, but most can retain and learn information better when given more meaningful opportunities to learn. Not all children need homework to make better grades. This study has taken steps to show that many children do just as well or better when they do not complete homework assignments. The reason for this could be a mathematical intelligence or a specific type of learning style. Some students are just naturally better at math than others. For these students math homework is a waste of time and energy. Their grades are excellent whether they complete the homework or not. Children of this nature most likely have an intelligence for mathematics. Some students learn by doing while others learn by seeing or hearing the information. All of these factors may have had an impact on this study.

The results from this study showed only significant results from one week. This lack of significance could have been caused by several factors. First, the sample size in this study was extremely small. With only nineteen students participating in the study, one could expect that the results would be skewed. In addition, the fact that students were allowed to choose whether they completed homework assignments had a significant bearing upon the research. Data changed from week to week, explaining the dramatic changes each week. Finally, the study was extremely short. The length may have had implications on the lack of significance of the study.

Recommendations

Teachers should use this study to examine the type of homework they assign. Is it meaningful to the students or is it just "busy work"? More homework did not in general equal higher scores on quizzes. In some of the tested weeks, it meant lower scores. Action needs to be taken in elementary schools to make homework meaningful and significant. Teachers need to reevaluate why they give homework and see if these reasons are that it is

expected or because it is an effective learning tool for students. This research provides teachers with concrete evidence that homework is not necessarily the most effective learning tool available for today's children.

If this study were to be replicated several new factors should be considered. First, homework in other subjects besides math should be examined. Math seemed to be a logical starting point because so many elementary teachers give homework each night in math. However, since this study showed limited improvement on math scores with homework, other research could be done to examine the effects homework has on other subjects in an elementary school setting. Upon replication of this study other researchers need to find which children have specific intelligences in math or science. Once these are identified, the study would be more concrete and would provide more evidence to the real effects that homework has. Future investigators need to focus on reducing the limitations on the study. In the current study, the students were allowed to choose whether or not they completed the homework assignments from week to week. Since these numbers changed from week to week the research was not as strong as it would have been if homework were given for a certain period of time and then not given. This would have eliminated one of the main limitations of the study. Another limitation stemming from this was the attitudes that some children had regarding homework. Some of the students in the study were forced to complete the weekly homework assignments by their parents while others decided themselves each week to do the homework. In future research attitudes for completing homework should be examined. Finally, a learning styles inventory should be given in future research to determine how students learn best. For some students homework is an effective way to learn but for others it is almost detrimental to their learning.

The results from this research were beneficial to the ongoing debate of whether or not homework should be given in the elementary school. Lengthy homework assignments that focused on drill and practice seemed to not be effective. Homework was at best in this

study a limited tool in aiding student academic success on the weekly math quizzes. While homework was somewhat effective when it was meaningful and relative to the material being covered, it did not show a great deal of significance in this study. Future research needs to broaden the scope of this debate to include not only academic success but also an increase in the motivation to learn and in more effective study habits.

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APPENDICES

APPENDIX A

KNOX COUNTY SCHOOLS
ANDREW JOHNSON BUILDING

Allen Morgan, Superintendent

September 28, 1998

Ms. Anne L. Greenwood
7900 Johnson Drive
Johnson Bible College Box 217
Knoxville, Tennessee 37998

Dear Ms. Greenwood:

You are granted permission to contact appropriate building-level administrators concerning the conduct of your proposed research study entitled, "The Effects of Weekly Math Homework on Fourth Grade Student Math Performance." In the Knox County schools final approval of any research study is contingent upon acceptance by the principal(s) at the site(s) where the study will be conducted.

In all research studies names of individuals, groups, or schools may not appear in the text of the study unless *specific* permission has been granted through this office. The principal researcher is required to furnish this office with one copy of the completed research document.

Good luck with your study. Do not hesitate to contact me if you need further assistance or clarification.

Yours truly,

Samuel E. Bratton, Jr.

Samuel E. Bratton, Jr., Ed.D.
Coordinator of Research and Evaluation
Phone: (423) 594-1740
Fax: (423) 594-1709

Project No. 912

APPENDIX B

September 7, 1999

Dear Parent(s),

My year in fourth grade is progressing very well. I am enjoying getting to know the children and learning how to teach them more effectively. As an intern this year, I am required to complete research in the classroom. My project will focus on the optional math homework that Mrs. Anderton assigns each week. Your child will not have any extra homework because of this project. I will simply record how many children did homework for the week and the scores for the weekly math quizzes.

Research will tentatively begin on Monday, September 21 and will end on Friday, December 11. I have received permission from Knox County and Mr. Robinette to complete this required research in Mrs. Anderton's class, but I still need permission from all the parents in the class.

Please fill out the bottom portion of this paper and return it by Friday, September 11. If you have any questions regarding this project, please feel free to contact Mrs. Anderton or myself. Thank you so much for your support this year.

Sincerely,

Laney Greenwood

_____My child has permission to participate in Ms. Greenwood's research.

_____My child does not have permission to participate in Ms. Greenwood's research.

_____ _____

Child's Name Parent's Signature